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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/700,136

11/03/2003

Tomio Matsuzaki

03663/LH

3722

1933

7590

01/04/2005

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EXAMINER

LOKE, STEVEN HO YIN

ART UNIT

PAPER NUMBER

2811

DATE MAILED: 01/04/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/700,136

Applicant(s)

MATSUZAKI ET AL.

Examiner

Steven Loke

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 05 November 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-35 is/are pending in the application.
- 4a) Of the above claim(s) 5-11 and 17-35 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-4 and 12-16 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date <u>11/3/03</u> . | 6) <input type="checkbox"/> Other: _____ |

1. Applicant's election without traverse of claims 1-4 and 12-16 in the reply filed on 11/5/04 is acknowledged.
2. Claims 5-11 and 17-35 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected species and invention, there being no allowable generic or linking claim. Election was made **without** traverse in the reply filed on 11/5/04.
3. The lengthy specification has not been checked to the extent necessary to determine the presence of all possible minor errors. Applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.
4. Claims 1-4 and 12-16 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 1, lines 6-7, the phrase "an upper surface, and a recess..." is unclear whether it is being referred to "an upper surface of the insulating film and a recess of the insulating film".

Claim 1, lines 9-11, the phrase "interconnections formed...on the bottom surface of the recess" is indefinite. Fig. 1 discloses each of the interconnections [8] formed on the bottom surface of a corresponding recess. It is believed that the phrase should rewrite as "each of the interconnections formed on the bottom surface of a corresponding recess".

Claim 4, lines 4-6, the phrase "an encapsulating film formed between the bump electrodes on the insulating film including the interconnections" is unclear as to how the insulating film including the interconnections. It is believed that the insulating film is different from the interconnections.

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

6. Claims 1, 2, 4, 12 and 13 insofar, as in compliance with 35 USC 112, are rejected under 35 U.S.C. 102(e) as being clearly anticipated by Takahashi et al.

In regards to claim 1, Takahashi et al. show all the elements of the claimed invention in fig. 1. It is a semiconductor device, comprising: a semiconductor substrate [111] having a plurality of connecting pads [112] on one surface; a composite insulating film ([114] and a lower portion of layer [130] having a height higher than the interconnections [115]) formed on one surface of the semiconductor substrate, and having holes each corresponding to one of the connecting pads [112], a recess of the composite insulating film having a bottom surface depressed from an upper surface of the composite insulating film in a direction of thickness; and each of the interconnections [115] formed on the bottom surface of a corresponding recess, and connected to the connecting pads [112] through the holes in the composite insulating film.

In regards to claim 2, Takahashi et al. further disclose each of the interconnections [115] is formed on the bottom surface of the corresponding recess in the composite insulating film.

In regards to claim 4, Takahashi et al. further disclose interconnections [115] have connecting pad portions, and which further comprises bump electrodes [116] formed on the connecting pad portions, and an encapsulating film (an upper portion of the layer [130]) formed between the bump electrodes on the composite insulating film and covering the interconnections [115].

In regards to claim 12, Takahashi et al. further disclose a portion of the composite insulating film is made of an organic resin (layer [114] is made of polyimide).

In regards to claim 13, Takahashi et al. further disclose the recess in the composite insulating film has a depth not less than a thickness of the interconnection [115].

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. Claims 14-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Takahashi et al.

In regards to claim 14, Takahashi et al. differ from the claimed invention by not showing the composite insulating film has a thickness of 10 to 30 μm . It would have been obvious to one having ordinary skill in the art at the time the invention was made for the composite insulating film has a thickness of 10 to 30 μm , since it has been held

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that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. In re Aller, 105 USPQ 233.

In regards to claim 15, Takahashi et al. differ from the claimed invention by not showing the recess has a depth of 5 to 15 μm . It would have been obvious to one having ordinary skill in the art at the time the invention was made for the recess has a depth of 5 to 15 μm , since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. In re Aller, 105 USPQ 233.

In regards to claim 16, Takahashi et al. differ from the claimed invention by not showing the composite insulating film has a thickness of not less than 1 μm from the bottom surface of the recess. It would have been obvious to one having ordinary skill in the art at the time the invention was made for the composite insulating film has a thickness of not less than 1 μm from the bottom surface of the recess, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. In re Aller, 105 USPQ 233.

9. Claim 3 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, 2nd paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

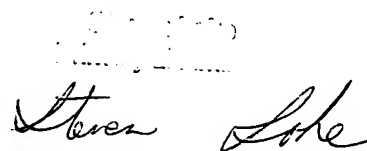
10. The following is a statement of reasons for the indication of allowable subject matter: The major difference in the claim not found in the prior art of record is spaces are defined between each interconnection and the side surfaces of the recess.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Steven Loke whose telephone number is (571) 272-1657. The examiner can normally be reached on 7:50 am to 5:20 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Eddie Lee can be reached on (571) 272-1732. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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December 26, 2004


Steven Loke